Assesment of Possibility of Mitigating the Adverse Effect of Water Limitation Stress on Growth and Yield of Potato (*Solanum tuberosum* L.) by Changing Planting Date

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ABSTRACT

Yazdani, A., Kazemeini, S. A., Ghadiri, H., Kamrar Haghighi, A. and Edalat, M. 2019. Assesment of possibility of mitigating the adverse effect of water limitation stress on growth and yield of potato (*Solanum tuberosum* L.) by changing planting date. **Seed and Plant Production Journal 35-2:** 1-23 (in Persian).

This field experiment was conducted to study the effects of water limitation stress and planting dates on growth and yield of potato in 2014-15 and 2015-16 growing seasons at Faculty of Agriculture, Shiraz University, Shiraz, Iran. Experimental treatments included, four irrigation levels: 55%, 70%, 85% and 100% of water requirement of potato assigned to the main plots, and three planting dates: March 11, April 9 and May 10 randomized in the sup plots as split plot arrangement in randomized complete block design with three replications. The results showed that plant height and shoot dry weight had a slow growth until 48 days after planting (DAP), however, these two traits considerably increased between 48-104 DAP. At early growth stage, plant height and shoot dry weight was slightly less in March 11 planting as compared with other planting dates, while these two traits were greater in March 11 planting. Water limitation stress reduced plant height, leaf area index, tuber number m^{-2}, tuber yield, biological yield and weight of seed and large tubers weight and increased small tuber weight. There was no significant difference between 100% and 85% of water requirement levels for most of measured traits. In water stress conditions planting date was more important. In 100% water requirement level there was no significant differences between planting dates. Whereas, in stressed conditions, growth and tuber yield of potato were greater in March 11 planting. In conclusion, the results indicated that potato performance was greater in March 11 planting date, particularly in water limited stress conditions, because of better use of precipitation, cooler temperature and lower evaporation in the early season as well as suitable temperature during tuber initation.

Key words: Potato, water requirement, leaf area index, seed tuber, tuber yield.

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Effect of Soil Removal Time from Buried Vine, Timing and Severity of Pruning on Reducing Spring Frost Damage in Vineyards in Cold Regions of Iran

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ABSTRACT

Hosseinabadi, H., Rasouli, M., Ebadi, A., Nejatian, M. A., and Ershadi, A. 2019. Effect of soil removal time from buried vine, timing and severity of pruning on reducing spring frost damage in vineyards in cold regions of Iran. **Seed and Plant Production Journal 35-2:** 25-40 (in Persian).

Many vine growers in cold regions of Iran, in the 'Khazandeh' vine training system, for protecting vines from freezing in automn and winter, and frost in early spring, bury vines in the autumn and remove soil in mid-April, and postpone pruning until the flower structure appears in the end of May. The aim of this study was to investigate the best time for soil removal of buried vines, timing and severity of pruning of vines following exposure to spring frost to reducing frost damage. Two experiments were carried out in 2015 and 2016 in the cv. 'Bidaneh Sefid' vineyard of Javersian, Khondab, Iran. The first experiment was conducted in randomized complete block design with three treatments and six replications. Treatments included: T_1: soil removal in 16 March, T_2: soil removal 4 April and T_3: soil removal in 24 April (control). The second experiment was carried out using randomized complete block design with 10 treatments and three replications. Each treatment was a combination of pruning time (19 March, 7 April and 27 April) and pruning severity based on the number of buds (4, 6 and 8 buds). In both experimentes, the vines experienced spring frost. In the first experiment, the best time for soil removal from buried vines was after 4 April. March 16 with lowest sprouted buds (%65) had the highest frost demage. In the second experiment, the number of cluster per sprouted buds (fertility coefficient) in short prunings (T_2L_1 and T_3L_1 with 50.5% and 48.9%, respectively) were significantly higher than the long pruning (T_1L_3 and T_2L_3 with 30.7% and 28.4%, respectively). On the other hand, T_3L_1 with 24.6 tonha^{-1} had the highest fruit yield. Considering the results of this study in the "Khazandeh" vine training system, when the vines are exposed to spring frost, to obtain a high sprouted buds (%), fertility coefficient and fruit yield, the best time for soil removal from buried vines and pruning is second half of April.

Key words: Grape, Bidaneh Sefid, Khazandeh vine training system, sprouted bud, feritility coefficuent, fruit yield.

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Evaluating of Potassium Uptake and Utilization Efficiency in Cotton Genotypes

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ABSTRACT

Gharanjiki, A., Dordipour, E., Alishah, O., and Ghaderifar, F. 2019. Evaluating of potassium uptake and utilization efficiency in cotton genotypes. **Seed and Plant Production Journal 35-2:** 41-57 (in Persian).

Identification and selection of efficient genotypes for uptake and utilization of potassium (K) can help to increasing potassium fertilizers and available soil potassium use efficiency in K-deficient soils. Therefore, efficiency of of potassium uptake and utilization 25 cotton genotypes was studied in deficient (0.025 mM) and sufficient (2.5 mM) potassium levels in a hydroponics experiment. Potassium efficiency of cotton genotypes were classified based on three criteria including; shoot dry weight in K-deficient level, the dry weight ratio (dry weight in K deficient : dry weight at K sufficient), and K use efficiency. Potassium deficiency decreased dry weight, K concentration and K uptake by root and shoot of cotton genotypes, while K use efficiency increased in deficient K level. Very high and significant correlation ($r = 0.98^{**}$) was observed between root and soot dry weight of genotypes. Correlations between root and shoot dry weight with K uptake and K use efficiency were also significant. Grouping of potassium efficiency of cotton genotypes identified six efficient genotypes based on soot dry weight and dry weight ratio, whereas only four efficient genotypes were identified based on K use efficiency. In conclusion, cv. Golestan, Sajedi and genotype N2G80 were selected as efficient genotypes for potassium uptake and utilization.

Key words: Cotton, potassium deficiency, potassium sufficiency dry weight, hydroponics.

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Evaluation of Drought Tolerance in Rice Recombinant Inbred Lines Using Stress Tolerance Indices

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ABSTRACT

Kazerani, B., Navabpour, S., Sabouri, H., Ramezanpour, S. S., Zaynali Nezhad, Kh. and Eskandari, A. 2019. Evaluation of drought tolerance in rice recombinant inbred lines using stress tolerance indices. **Seed and Plant Production Journal 35-2:** 59-81 (in Persian).

To evaluate drought tolerance in rice recombinant inbred lines obtained from a cross between two cultivars of Ahlami-Tarom (tolerant) and Sepidrood (susceptible), a field experiment was conducted in spring 2016 in the research farm of Gonbad Kavous University. One hundered sixteen genotypes were studied using randomized complete block design with three replications in two environments (drought stress and non-stress conditions). MP, GMP, STI, RDY, HM, K_1STI and K_2STI indices had high correlations with grain yield under the two environments (drought stress and non-stress), therefore were identified as suitable indices for selecting drought-tolerant lines. A biplot analysis perfermed based on the first and second components of principle component analysis showed that lines No. 12, 112, and 113 were the most tolerant, and lines No. 43, 50, 64, and 89 were sensitive genotypes. Moreover, biplot also identified SNPI and SSPI suitable for identifying tolerant genotypes to drought stress. Grouping of lines based on 17 drought tolerantce indices and grain yield in the stress and non-stress conditions was performed by cluster analysis using Ward method, and four clusters were formed. The second and fourth clusters, with the highest and lowest K_2STI, included the most tolerant and most sensitive genotypes to drought stress, respectively. Overall, according to the biplot and cluster analyses, lines No. 112 and 64 were identified as the most tolerant and most sensitive genotypes, respectively. Grain yield of line No. 112, in the drought stress and non-stress conditions was 5190 and 6640 $kgha^{-1}$, respectively. However, grain yield of line No. 64, in the drought stress and non-stress conditions were 1640 and 2240 $kgha^{-1}$, respectively.

Key words: Rice, genetic diversity, drought stress, cluster analysis, discriminant function analysis.

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Evaluation of Cold Stress Tolerance and Some Agronomic Characteristics of Bread Wheat Promising Lines

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ABSTRACT

Ahmadi, N., Jasemi, S. Sh., and Aghayari, F. 2019. Evaluation of cold stress tolerance and some agronomic characteristics of bread wheat promising lines. **Seed and Plant Production Journal 35-2:** 83-101 (in Persian).

To evaluate the cold tolerance potential of bread wheat promising lines, an experiment was conducted based on the alpha-lattice design with two replications during 2015-16 at the Seed and Plant Improvement Institute, Karaj, Iran. In this study, 16 promising lines obtained from the adaptation trial of temperate agro- climatic zone, and 12 promising lines obtained from the adaptation trial of cold agro- climateic zone, were evaluated for cold stress tolerance using an integrated method (laboratory and field). The cold-acclimated plants were sampled from the field in the early January 2015, and the potential of cold strss tolerance in plants was determined by measuring LT50 (the temperature at which 50% of plants are killed) using a regulatable freezer. The results showed that among the temperate adapted lines, eight lines and cv. Baharan had a lower LT50 than Parsi (check cultivar) with LT50 = -6°C and the lowest LT50 (-12°C) was related to line M-94-7. Among the cold adapted lines, eight lines had a lower LT50 than Mihan (check cultivar) with LT50 = -12°C and the lowest LT50 (-15°C) was related to lines C-94-11 and C-94-13. Cold stress tolerance in cultivars Heydari (-9.5°C) and Orum (-11.5°C) was lower and in Zarea (-13°C) was more than the cv. Mihan. Six lines from temperat agro- climatic zone and nine lines from cold agro- climatic zone had lower LT50 (cold tolerance), and higher grain yield than Parsi and Mihan, respectively.

Key word: Wheat, cold stress, acclimatization, grain yield, LT50.

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Evaluation of Some Morpho- Physiological Responses of Citrus Genotypes to Salinity Stress

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ABSTRACT

Etahadpour, M., Fattahi Moghaddam, M. R., Zamani, Z., Golein, B., and Naghavi, M. R. 2019. Evaluation of some morpho- physiological responses of citrus genotypes to salinity stress. **Seed and Plant Production Journal 34-2:** 103-120 (in Persian).

To identify salinity tolerant citrus genotypes, two international tolerant (Cleopatra mandarin) and sensitive genotypes (Troyer Citrange), and some screened citrus genotypes for salinity tolerance from citrus research center of Ramsar and Darab research station (total 28 genotypes) were evaluated under glasshouse conditions. Three levels of salinity stress including; zero (control), 40 and 90 Mm sodium chloride were applied on eight months seedlings of citrus genotypes. In 12th week after the application of salinity stress morpho- physiological characteristics including; leaf area, specific leaf area, growth rate, stem diameter, leaf thickness, fresh and dry weight, leaf necrosis and loss, leaf relative water content (RWC), sodium and potassium content, and potassium : sodium ratio were measured and studied. The studied genotypes showed different responses for all traits, except for specific leaf area. Salinity stress caused significant reduction in leaf area, growth rate, stem diameter, leaf thickness, fresh and dry weights and RWC. Furthermore, significant increase of leaf necrosis and loss, and leaf sodium and potassium concentration were observed. Study of stress tolerance score (STS) showed that two Iranian landraces including G25 and G8 and tolerant genotype (Cleopatra) had high salinity tolerance. G8 and Cleopatra were selected as the tolerant genotypes based on physiological traits and STS. In condusion, considering horticultural characteristics, these two genotypes can be recommended as rootstock in areas with saline soil and water.

Key word: Cleopatra mandarin, citrus, tolerant genotype, stress tolerance score.

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Scientific Short Article

Effect of Light Quality on Some Characteristics of Transplant of Different Tomato (*Lycoperisicum esculentim*) Cultivars

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ABSTRACT

Soleimani, M., Alemzadeh Ansari, N. and Hassibi, P. 2019. Effect of light quality on some characteristics of transplant of different tomato (*Lycoperisicum esculentim*) cultivars. **Seed and Plant Production Journal 35-2:** 121-126 (in Persian).

Effect of different light spectral quality; red (R), blue (B), red- blue (RB), white (W) from diodes and fluorescent lamps- tungsten (FT) on growth and development of transplants of four tomato cultivars; Ameera, Valouro, Karoon and Pamela, was studied. The experiment was carried out as factorial arrangements in completely randomized design with three replications. The results showed that most of the studied characteristics of transplants were affected by cultivar × light quality interaction. The tallest transplant height (16.63 cm) was observed in cv. Pamela under R, and the shortest (6.09 cm) in cv. Valouro under RB. The highest stem diameter (3.97 mm) belonged to cv. Karoon under RB, and the lowest stem diameter (2.02 mm) was measured in cv. Valauro under FT. The greatest leaf dry weight (0.27 g) was observed in cv. Karoon under RB, and the lowest (0.22 g) in cv. Valouro under R. The highest root dry weight (0.102 g) belonged to cv. Pamela under RB, and the least (0.02 g) in cv. Valouro under FT. In conclusion, blue (B) and Red- Blue (RB) lights can be used for producing tomato transplant.

Key word: Tomato, light- emitting diodes, artificial light, growth room, chlorophyll.

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Scientific Short Article

Application if Image Processing Technique for Estimating Chilling Injury to Mango Fruit

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ABSTRACT

Shamili, M., Golzarian, M. R., Azarkish, P. and Doosti Iran, O. 2019. Application if image processing technique for estimating chilling injury to mango fruit. **Seed and Plant Production Journal 35-2:** 127-131 (in Persian).

To estimate quantitative and quality of agricultural products, a non- destructive technique as image processing would be very useful and practical. This research examined the estimation of chilling injury in mango fruit using image processing technique. The experiment was arranged as factorial in completely randomized design with two factors; temperature (5, 15 and 24ºC) and observation (7 observation in 48hrs. interval), and three replications. Analysis of variance revealed significant differences between treatments for some quantative and quality traits of fruit such as total acid (TA), total soluble solids (TSS) and fruit firmness. The results showed positive significant correlation between TSS and image character "a*" and "L*" (r = 0.545** and r = 0.548**, respectively). There was negative significant correlation between fruit firmness and image characters "a*" and "L*" (r = -0.534** and r = -0.548**, respectively). In dertructive methed (laboratory) fruit characteristics changed after fourth and fifth observations when fruit internal characteristics have been affected. However, image processing revealed the differences between treatments in second observation.

Key word: Mango, fruit weight, non- destructive evaluation, total soluble soils, total acid.

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